Cal Stott
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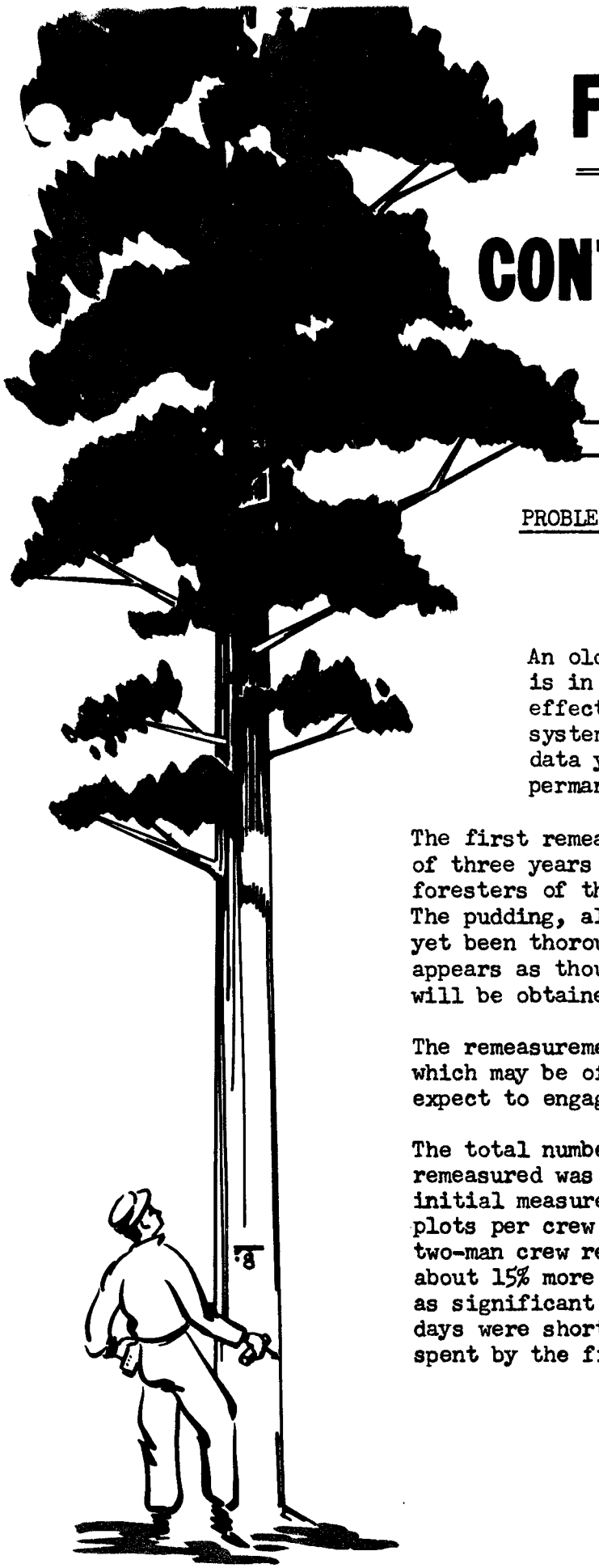

FOREST CONTROL by CONTINUOUS INVENTORY

"Today I have grown taller from walking with the trees."

...Karle Wilson

Milwaukee, Wis. December, 1956 No. 33

PROBLEMS OF REMEASUREMENT UNDER A CONTINUOUS INVENTORY SYSTEM

An old adage states "The proof of the pudding is in the eating thereof". The proof of the effectiveness of the Continuous Inventory system lies in the amount and accuracy of the data yielded by periodic remeasurements of permanent CFI plots.

The first remeasurement of such plots covering a period of three years was completed in the fall of 1956 by the foresters of the Minnesota and Ontario Paper Company. The pudding, although it has now been eaten, has not yet been thoroughly digested. In spite of this, it appears as though a great deal of significant data will be obtained from this first remeasurement.

The remeasurement work itself brought out some matters which may be of interest to all who are engaged or expect to engage in this type of work.

The total number of plots initially established and also remeasured was 749 plots of 1/7 acre in size. In the initial measurement, a two-man crew established 2.95 plots per crew day. In the remeasurement work, a two-man crew remeasured 3.64 plots per crew day or about 15% more on the average. This was probably not as significant as was the fact that the actual work days were shorter with many 10 or 12 hour days being spent by the field crew during the initial survey.

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Transportation of crews to the plots and locating them was a time-consuming part of the job. In conducting the field work initially in order to reach all of the plots by the most efficient means of transportation; planes, trucks, jeeps, cars and boats as well as a considerable amount of foot travel was used. One additional piece of equipment was added during the remeasurement which significantly reduced the amount of time and effort in the remeasurement in the case of reaching many swampy isolated areas. This was the use of the Bombardier muskeg tractor manufactured by Bombardier Snowmobile Ltd. of Valcourt Que., Canada. This equipment easily carries a crew of several men over swampy winter roads which could normally be traversed only on foot during the summer months when this work was done.

All of the plots initially established were found on the remeasurement, most of them with very little difficulty. One of the most annoying things encountered in finding the plots for remeasurement, was the fact that the penta treated red-topped cedar posts established for the plot centers seemed to be extraordinarily attractive to bears. It is not known whether it was the red paint or the penta salts which attracted the animals but between 1/3 and 1/2 of the plot stakes were removed and chewed up by bear, many of them being carried away so that they were never found. (One crew on the remeasurement job had a bear meander between them as they were remeasuring the plot. It was presumed that he was looking for the center stake.). From 3-4 witness trees which were established to help locate the plot centers were the only means by which the missing centers were re-established. It was recommended by the field men that aluminum center stakes replace the wooden stakes at the next measurement.

In identifying witness trees and numbering and marking D.B.H. on the trees on the plots, a blue enamel paint in pressurized cans was used. In most cases the marks on the trees were still very readable at the remeasurement three years later. Trees in more exposed locations lost their legibility faster than those in a closed stand. Aspen, which has a smooth, waxy, green-white bark and is one of the faster growing trees, lost its legibility faster than any other species. Wherever the paint marks had faded or entirely disappeared it could generally be traced to the fact that the measurement occurred on a rainy day when the bark was wet. Marks on trees which were dry at the time the paint was applied did not appear to have this difficulty. The paint used was in disposable pressure cans and though rather expensive, its convenience probably offset the extra cost. Experience showed that it was easier to relocate each tree if the tree number was above the D.B.H. mark rather than below it.

It might be of interest to describe some of the methods used and errors found during the remeasurement which might help in future work of this kind. The original I.B.M. plot total listing for each plot was taken to the field during the remeasurement and provided a very useful reference for checking purposes.

On the initial measurement job, there were 13,365 trees measured for which cards were mark sensed in the field. In addition, there were 749 plot cards. In view of the large number of cards handled, the number of errors picked up on the first remeasurement were almost negligible. In errors of exact measurement, 54 trees out of the above had an incorrect initial D.B.H. measurement or mark sensing error. A number of these errors resulted from dropping a digit. In errors of judgment, there

were 73 trees which were incorrectly identified or wrongly marked sensed as to species. In addition, 55 trees which were missed on the plots during the initial survey were picked up on the remeasurement. No trace could be found of 4 trees numbered and measured initially on the plots. One of these trees was a particularly large one which made it difficult to understand what might have happened to it.

It appeared as though mark sensing cards directly in the field was less likely to result in errors than coding in the field and punching to cards in the office. At the second measurement, all plot and tree data which remained the same for the remeasurement was pre-punched into the cards prior to taking them into the field so it was only necessary to mark sense data which changed during the three-year period. This speeded up the field job considerably and did not result in any particular difficulties. There was no card damage resulting from this method of handling.

In connection with I.B.M. machine work, some of the usual difficulties were experienced. One in particular occurred when several master volume and variance cards were mis-sorted in front of the detail cards which in one instance resulted in double punching the master card information and in another, punching the wrong base volumes and variance percentage into one entire diameter range. In any case, despite these difficulties, the more experience that is gained with I.B.M. work, the easier it becomes to set up work flow charts. Experience with this system has proved that the construction of a complete work flow chart and form layouts for each listing and tabulation well in advance of the I.B.M. machine work resulted in a much better understanding of the exact procedures by the I.B.M. technician and therefore, saved considerable time.

Although all of the data has not yet been worked up into final form, it is planned that a conference of all who were involved in the job and all who have an interest in the results will be held to analyze such results. It appears as though this will be of the greatest importance in guiding future remeasurement work and in getting the most out of the available data.

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